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Vehicle seat

The invention relates to a vehicle seat according to the precharacterizing clause of claim 1.

In a known vehicle seat (DE 10 63 049 A1, DE 101 63 050 A1, DE 101 63 051 A1), an air duct with an air inlet opening arranged on the rear side of the head cushion, which side faces away from a seat user, and a hot air outlet opening arranged on the front side facing the seat user are formed in the head cushion of the head restraint. The hot air device is integrated in the air duct and comprises an electric heating element and an axial fan which are arranged one behind the other in the air duct. The air sucked in by the axial fan via the air inlet opening on the rear side of the head cushion is guided over the heating element, and the hot air is blown out of the hot air outlet opening directly into the neck and head region of the seat user, with hot air acting directly more on the neck and shoulder region or more on the neck and head region of the seated person depending in each case on the set height of the head restraint.

The invention is based on the object of improving the hot air heating of the neck and head region of a seat user in such a manner that the sensation of coziness felt by seat users even of differing body size is improved.

The object is achieved according to the invention by the features of claim 1.

The vehicle seat according to the invention has the advantage that, by means of the arrangement of the hot air outlet opening on the lower side of the head

cushion and the shielding of the intermediate space between head cushion and back rest to the rear, the back of the seated person's head is not directly subjected to hot air but, in the neck and head region of the seat user, a heat cushion is built up which also extends over the shoulder region. A heat cushion of this type imparts to the seat user a very much greater sensation of warm coziness than is achieved when he is directly subjected to hot air, since there are no noticeable air streams or temperature strands in the heat cushion. This heat cushion is maintained even in the case of a height-variable head restraint which is set in accordance with the body size of a seat user, since the heat cushion is always built up in the intermediate space between head cushion and back rest and said intermediate space always remains shielded to the rear irrespective of the setting of the head cushion.

Advantageous embodiments of the vehicle seat according to the invention together with expedient developments and refinements of the invention are indicated in the further patent claims.

According to an advantageous embodiment of the invention, an air-guiding element is arranged in the intermediate space between head cushion and back rest and is designed in such a manner that the hot air flowing out of the hot air outlet opening is deflected toward the neck and head region of the seated person. In this case, the air-guiding element may be formed separately and fastened to the upper side of the back rest, but it may also be formed integrally with the covering.

The invention is described in more detail below with reference to exemplary embodiments illustrated in the drawing, in which, in each case in a diagrammatic illustration:

fig. 1 shows part of a side view of a back rest and head restraint of a vehicle seat, with the head restraint and integrated hot air device illustrated in section;

fig. 2 shows part of a perspective illustration of back rest and head restraint in the direction of the arrow II in fig. 1,

fig. 3 shows part of a rear view of back rest and head restraint with the hot air device according to a further exemplary embodiment,

fig. 4 shows part of a side view of a vehicle seat, which is occupied by a seat user, with the back rest and head restraint (illustrated in longitudinal section) together with the hot air device according to a third exemplary embodiment,

fig. 5 shows a side view of back rest and partially cut away head restraint with integrated hot air device of a vehicle seat, according to a fourth exemplary embodiment,

fig. 6 shows a section along the line VI - VI in fig. 5.

The vehicle seat, part of which is illustrated in each case in side view in fig. 1 and in a perspective rear view in fig. 2, has, in addition to the seat cushion (not illustrated here), a back rest 11, a height-adjustable head restraint 12 and a device 13 for heating the neck and head region of a seat user 10 (fig. 4) with hot air, called hot air device 13 for short below. The head restraint 12 comprises in a known manner a U-shaped supporting hoop 14 with two parallel supporting rods 141, 142 (fig. 6) and a head cushion 15 which is fastened to a transverse part of the

supporting hoop 14, which transverse part connects the two supporting rods 141. The supporting rods 141, 142, of which only the supporting rod 141 can be seen in fig. 1, are guided in a known manner in the back rest 11 such that they can be displaced axially, so that the set height of the head restraint 12, i.e. the distance of the head cushion 15 from the upper side 111 of the back rest 11, can be changed in accordance with the size of the seat user 10.

An air-guiding duct 16 is formed in the head cushion 15 and has an air inlet opening 17 on the rear side 151 of the head cushion 15, which side faces away from the seat user 10, and a hot air outlet opening 18 arranged on the lower side 152 of the head cushion 15. Air inlet opening 15 and hot air outlet opening 18 are in each case closed by a grille 19 or 20, a "rosette". The hot air device 13 is integrated in the air-guiding duct 16 and comprises an electric heating element 21, which can be designed, for example, as an electric heating coil, and an axial fan 22 which is preferably designed as a miniature fan. Heating element 21 and axial fan 22 are arranged one behind the other in the air flow direction, with it being possible for the axial fan 22 to be arranged upstream or downstream of the heating element 21. There is an intermediate space, the height of which varies depending on the height setting of the head restraint 12, between the lower side 152 of the head cushion 15 and the upper side 111 of the back rest 11. This intermediate space is shielded to the rear, i.e. toward the side facing away from the seat user 10, by means of a covering 23 which extends on the rear side 151 or 152 of head restraint 12 and back rest 11 from the lower side 152 of the head cushion 15 as far as the upper side 111 of the back rest 11. The covering may also be guided laterally around the supporting rods 141, 142, as is illustrated in figs. 1 and 2. As a result, the covering 23 has a rear wall 231 which shields the intermediate space to the rear, and two

side walls 232 and 233 (figs. 1 and 2) which partially laterally cover the intermediate space. The rear wall 231 and the two side walls 232, 233 extend from the lower side 152 of the head cushion 15 as far as the upper side 111 of the back rest 11.

The covering 23 differs in design taking the height adjustability of the head restraint 12 into consideration:

In the exemplary embodiment of figs. 1 and 2, the covering 23 is an elastic curtain which is fixed in the manner described above to the head cushion 15 and to the back rest 11. During the height adjustment of the head restraint 12, the elastic curtain is stretched to a greater or lesser extent, so that the intermediate space between head cushion 15 and upper side 111 of the back rest 11 is always screened to the rear, and also partially laterally in the exemplary embodiment of figs. 1 and 2. An air-guiding element 24 which is fastened on the upper side 111 of the back rest 11 is arranged in the intermediate space, within the region enclosed by the covering 23. The air-guiding element 24, which is designed here as a wedge, is arranged in such a manner that the hot air flowing out of the hot air outlet opening 18 is deflected toward the neck and head region of the seat user 10.

In the exemplary embodiment of fig. 3, the covering 23 is designed as an apron 26 which, on the one hand, is fastened to the lower side 152 of the head cushion 15 and, on the other hand, is clamped on the rear side 112 of the back rest 11 by means of two elastic straps 27, 28. A cloth or else a stiff plate can be used as the apron 26.

In the exemplary embodiment, part of which is illustrated in fig. 4, of a vehicle seat, the back rest 11 has a raised back rest end portion 29 which is an

integral part of the back rest 11. The axial depth of the back rest end portion 29, as seen in the longitudinal direction of the seat, is substantially smaller than the axial depth of the back rest 11. The width of the back rest end portion 29, as seen in the transverse direction of the seat, corresponds approximately to the width of the head cushion 15. The guiding of the supporting hoop 14 in the back rest 11 is undertaken in the region of the back rest end portion 29. The head cushion 15 is designed in such a manner that it engages over the back rest end portion 29 on its front side facing the seat user 10, to be precise in such a manner that the engagement over is maintained even when the height of the head restraint is set to the maximum. By means of this manner of constructing the back rest 11, the intermediate space formed between the lower side 152 of the head cushion 15 and the upper side 111 of the back rest 11 is covered by the back rest end portion 29 which takes on the function of the covering 23 in figs. 1-3. Otherwise, the head restraint 12 with head cushion 15 and hot air device 13 integrated therein is designed identically to the head restraint 12 in fig. 1, and so identical structural elements are provided with the same reference numbers. In a modification of the head cushion 15 in fig. 1, the head cushion 15 in fig. 4 is slightly beveled on its lower side 152, so that the normal of the hot air outlet opening 18, which is situated in this beveled portion, is set at an acute angle to the vertical and points in the direction of the shoulder region of the seated person. This setting of the normal of the hot air outlet opening 18 obtains the same effect as with the air-guiding element 24 in fig. 1.

In the exemplary embodiment, illustrated in fig. 5, of the vehicle seat, the air-guiding element 24' for deflecting the hot air flowing out of the hot air outlet opening 18 to the head, neck and shoulder region

of the seat user 10 is not designed as a wedge - as in fig. 1 - but rather in the form of a trough. The air-guiding element 24' extends from the upper side 111 of the rear side 12 through the hot air outlet opening 18 into the air-guiding duct 16. The vertical length of the air-guiding element 24' is selected such that, at maximum height setting of the head restraint 12, the air-guiding element 24' still dips into the air-guiding duct 16. The air-guiding element 24' is fastened on the upper side 111 of the back rest 11 by means of two fastening tabs 30, 31 which surround the supporting rods 141, 142 of the head restraint 12 with play. The air-guiding element 24' at the same time takes on the function of the covering 23, with the trough base forming the rear wall 231 and the trough side walls forming the side walls 232 and 233 of the covering 23. That end of the trough-shaped air-guiding element 24' which projects into the air-guiding shaft 16 is open, so that the hot air already partially flows into the air-guiding element 24' and flows out via the trough opening, as it is arranged by air-guiding arrows in fig. 5. The other trough end which lies opposite the open trough end is closed by an end wall running obliquely from the trough base toward the trough opening. The air-guiding element 24' can be seen in cross section in fig. 6.